

# Executive Summary

Washington State is incrementally upgrading Amtrak *Cascades* (passenger rail) service along the Pacific Northwest Rail Corridor in western Washington. The state's goal is to provide safe, faster, more frequent, and more reliable passenger rail service.

The state's vision for passenger rail in the Pacific Northwest extends over a 20-year horizon. The vision is being implemented through an incremental approach. Service is being increased over time based on market demand, available partners and legislative funding.

The vision of reduced travel times and better passenger rail service in the Pacific Northwest began in the late 1980s when the Washington State Legislature funded a program to improve rail depots across the state. In 1991, the Washington State Legislature directed (Substitute House Bill 1452) the Washington State Department of Transportation (WSDOT) to develop a comprehensive assessment of the feasibility of developing a high speed ground transportation system in the state of Washington.

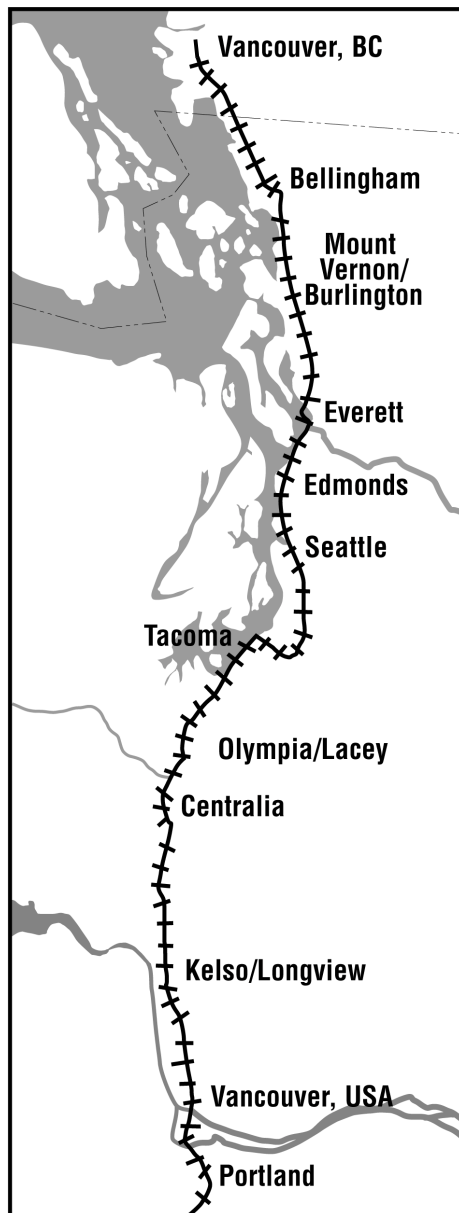
In October 1992, the High Speed Ground Transportation Study was delivered to the governor and the legislature. This study

confirmed the feasibility of developing high speed rail in the region.

Following release of this study in April 1993, WSDOT was directed (Revised Code of Washington Chapter 47.79) to develop "high-quality intercity passenger rail service ... through incremental upgrading of the existing (Amtrak) service."

Implementation of high speed service through an incremental approach permits a logical progression of infrastructure investments that enhance service frequencies. It also allows performance to be guided by market demand. The legislature believed this step-by-step approach would help to build a "rail culture" in the region that would eventually make rail a competitive and viable alternative to automobile and commuter air travel.

Also in the early 1990s the U.S. Department of Transportation's Federal Railroad Administration designated the Pacific Northwest Rail Corridor one of five high speed rail corridors in the United States. This designation helps our region compete for potential federal funds to assist the state with



**Figure ES-1**  
**The Pacific Northwest Rail**  
**Corridor between Portland,**  
**OR and Vancouver, BC.**

planning and implementing improved passenger and freight rail service throughout the corridor.

The Pacific Northwest Rail Corridor is the only federally-designated passenger rail corridor in the nation with both international and bi-state ties, extending from Eugene, OR, through Washington State, to Vancouver, BC. It stretches 466 miles and includes approximately 134 miles in Oregon, 297 miles in Washington and 35 miles in British Columbia.

Freight and passenger rail is an important part of our state's transportation system. Moving people and goods by rail is safer and more friendly to the environment than adding traffic to our already congested highways. Improvements to the state's rail system, whether funded by the private sector or the public sector, can help mitigate the impacts of our fast growing economy and population.

The purpose of WSDOT's passenger rail program is to:

- Provide a viable, cost effective travel mode that significantly increases options for intercity travel.
- Respond to the direction given in Revised Code of Washington Chapter 47.79 to develop high quality passenger rail service through the incremental upgrading of the existing service.
- Develop fast, frequent, safe and reliable Amtrak *Cascades* service that does not require an operating subsidy.
- Reduce the overall impacts of transportation improvements on local communities and the environment.

- Increase safety throughout the corridor.
- Team with our partners and customers to provide more efficient, predictable, reliable and cost effective movement of people and goods.

## Where Do The Trains Run?

Amtrak operates Amtrak *Cascades* service in the state of Washington over the Burlington Northern and Santa Fe Railway (BNSF) main line. The alignment roughly parallels Interstate 5 and runs through a number of cities and towns in nine counties in western Washington: Clark, Cowlitz, Lewis, Thurston, Pierce, King, Snohomish, Skagit, and Whatcom. These trains also travel through parts of Oregon and British Columbia. The Oregon portion of the corridor is discussed in a separate document prepared by the Oregon Department of Transportation.

## Who Are The Partners For This Rail Program?

Corridor development is a cooperative effort of many partners, including the states of Oregon and Washington, BNSF, Union Pacific Railroad, Amtrak, Sound Transit, the Province of British Columbia, ports, local communities, and ticket buying passengers.

Throughout the program, WSDOT and our partners are continually reviewing system improvements and negotiating cost allocations (who pays for what).

## What Work Has Already Been Done Or Is Currently Underway?

Over the past six years, the states of Washington and Oregon have commissioned a series of feasibility studies to assess the practical problems, costs, and benefits of

providing public investment to upgrade the corridor for fast, frequent, safe and reliable passenger rail service.

Completed projects include track, safety system and station improvements and renovations throughout the corridor.

These efforts have resulted in expanded service between Portland and Seattle (1994 and 1998); reinstated service between Seattle and Vancouver, BC (1995); expanded service between Portland and Eugene (1994); and additional service between Bellingham and Seattle (1999). New Amtrak *Cascades* service, featuring new trains built by Talgo, Inc. and upgraded customer amenities, were introduced (1999). Station improvements throughout the corridor have also been completed (Bellingham; Olympia/Lacey; Centralia; Kelso/Longview; Vancouver, WA) or initiated (Mt. Vernon/Burlington; Everett; Seattle).

To date, more than \$125 million has been invested by the state of Washington. Our partners, Oregon, Amtrak and BNSF, have invested over \$350 million for implementation of improvements to the overall rail system.

## **Why Can't We Just Increase Train Speeds And Put More Trains On The Track Now?**

Amtrak *Cascades* trains operate primarily on tracks owned by BNSF; they share those

tracks with freight trains. With increases in passenger and freight rail service, the tracks are reaching their capacity.

Congestion is due to the increased number of trains on the track, particularly where bridges or tunnels limit the system; where freight trains are put together and/or taken apart; and where rivers, shorelines, and mountains limit train service. If more passenger trains are added to this corridor, improvements must be made to relieve or bypass these chokepoints.



*A new Amtrak Cascades train, introduced in the Pacific Northwest Rail Corridor in January 1999.*

In addition, maximum authorized passenger train speeds are 79 mph on most lines in the corridor. These speeds are the highest allowed by the Federal Railroad Administration's regulations for the current type of track and signal system. To increase speeds above 79 mph,

improvements to the tracks and crossing signals need to be made.

It is also important, because of the increasingly diverse activities on the railroad system, to install newer, centralized control systems. These improvements, together with track improvements, will ensure the needs of the many users of BNSF's railway are met.

Analysis and computer models show that once these infrastructure improvements are in place, passenger rail service can be increased to a level that will result in up to 2.2 million passengers per year; 300 million

passenger-miles per year<sup>1</sup>; and hourly service between Seattle and Portland. The system will carry these people with no automobile emissions, improved safety, and no operating subsidy.

## What Type Of Service Is WSDOT Planning?

Washington State plans to continue to incrementally improve Amtrak *Cascades* service over the next 20 years.

Improvements to track, safety systems, train equipment and stations will reduce travel times, increase train frequency, and improve safety and reliability. The program first began in the early 1990s when the states of Washington and Oregon, the province of British Columbia, and other partners worked together to introduce new corridor train service between Seattle-Portland and Seattle-Vancouver, BC.

WSDOT's current plans outline rail corridor and service development through 2018. During this time railroad infrastructure and service will be incrementally upgraded based upon market demand, the availability of investments by our partners, and legislative appropriation.

## What Impact Does Funding Have On Service Upgrades?

Amtrak *Cascades* service improvements, including train frequencies, listed in this Plan are based upon budgets and goals listed in the Washington Transportation Plan. Development of improved Amtrak *Cascades* service is dependent upon investments from Washington State, Amtrak and other project partners. If these funds are not available in the required amount, service goals will not

be met. If additional funds are available, service improvements can be accelerated.

Table ES-1 presents an overview of the number of round-trip passenger trains per day for current and planned service along the corridor. Table ES-2 summarizes travel times for this service.

**Table ES-1**  
**Round-trip Corridor Trains (Per Day)\***

<i>Destination</i>	<b>1993</b>	<b>1999</b>	<b>2003</b>	<b>2018</b>
Portland, OR to Seattle, WA	1	3	8	13
Seattle, WA to Vancouver, BC	0	2**	3	4
Vancouver, BC to Portland, OR	0	N/A	2	2-3

\*Does not include the Coast Starlight.

\*\*Amtrak *Cascades* #761/762 travels between Seattle and Bellingham. A motorcoach connection to Vancouver, BC is provided at Bellingham.

**Table ES-2**  
**Corridor Train Travel Times**  
**(Plus/Minus Ten Minutes)**

<i>Destination</i>	<b>1993</b>	<b>1999</b>	<b>2003</b>	<b>2018</b>
Portland, OR to Seattle, WA	3:55	3:30	3:15	2:30
Seattle, WA to Vancouver, BC	N/A	3:55*	3:40	2:57
Vancouver, BC to Portland, OR	N/A	N/A	6:57	5:37

\*Travel time for train #760/763.

## How Many People Will Ride The Train?

The goal of the state's rail program is to serve almost 2.2 million passengers per year by 2018. Based on current ridership and in-depth computer modeling this projection is very realistic.

<sup>1</sup> Pacific Northwest Rail Corridor Operating Plan, Years 2003 and 2018. December 1997.

Ridership on the corridor trains has increased substantially in recent years. Prior to April 1994, before service expansion began, annual ridership on the Seattle to Portland train was under 95,000 per year.

Total ridership in the Pacific Northwest Rail Corridor has risen from 226,000 (1993) to approximately 565,000 (1999). Today,

approach is designed to serve the needs of both riders and taxpayers.

## Are We On Track?

The information presented in this document represents WSDOT's goals for intercity passenger rail service over the next 20 years. In order to measure its success, WSDOT compares such factors as ridership and

**Table ES-3**  
**Pacific Northwest Rail Corridor Annual Ridership**  
**Vancouver, BC to Portland, OR**

	1993	1995	1997	1999	2003	2018
Amtrak Cascades	94,100	286,700	346,000	450,000	1,094,000	1,920,000
Other Amtrak Service	132,300	103,800	139,000	115,200	225,800	260,200
TOTAL	226,400	390,500	485,000	565,200	1,319,000	2,180,200

*Source: Amtrak West Ridership and Revenue Summary, September 1999, the Pacific Northwest Rail Corridor Operating Plan Years 2003 and 2018 and the WSDOT Pacific Northwest Rail Corridor 1996 Ridership Comparison Sheet.*

corridor trains run daily and carry 87 percent of passengers traveling by rail between Portland and Vancouver, BC. Long-distance trains carry 13 percent of all riders in the corridor. Table ES-3 illustrates current ridership in the corridor as well as five-year and 20-year projections.

However, WSDOT recognizes that market forces change over time. Thus, if ridership goals are not met for each service level of the program, increased service may not be provided or may be deferred. On the other hand, if ridership along the corridor increases beyond WSDOT's projections and additional legislative funding is available, it would be possible to increase service in a shorter time frame. This incremental

revenue, frequency of service, and travel times with the goals presented in this planning document.

## What Improvements Need To Be Made To Meet WSDOT's Service Goals?

Improvements identified by WSDOT and our partners include:

- Upgrading grade crossings;
- Increasing speeds to improve corridor capacity and travel times;
- Enhancing train control signals to improve rail corridor capacity;
- Increase train speeds, and enhance safety

- Upgrading tracks and facilities to relieve congestion, improve ride quality and safety, increase train speeds, and improve corridor capacity;
- Purchasing new passenger train equipment to operate along the corridor to increase frequencies and using tilt technology to decrease travel time; and
- Improving stations and their ability to serve neighboring communities and to provide modal connections.

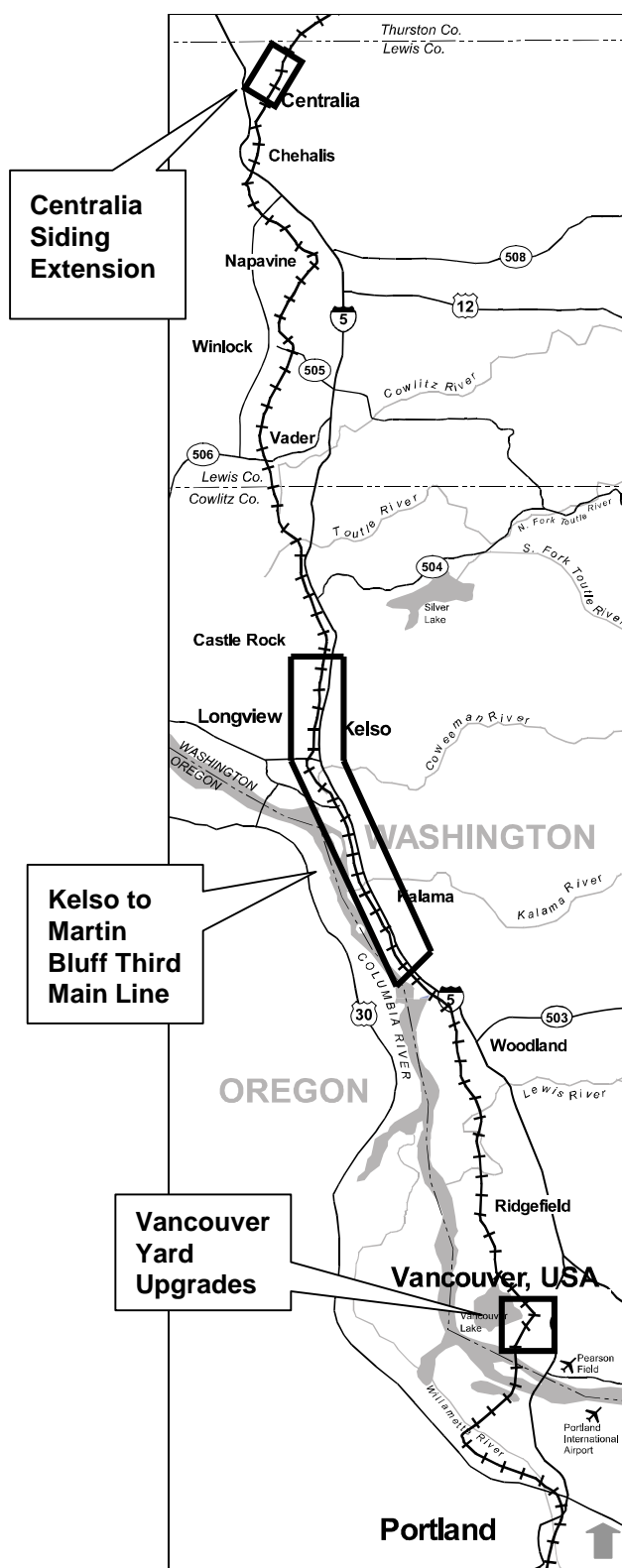
## Service Level One (Five Year) Projects

As part of our near-term service goals, WSDOT has begun to identify specific projects for design and construction within the next five years. More information about these projects will be contained in the environmental review documentation being prepared by WSDOT in accordance with the National Environmental Policy Act/State Environmental Policy Act (NEPA/SEPA). The environmental documentation will be released in mid-2000.

Financing these projects and determining who will pay for them will be negotiated during 2000. Following implementation of these projects and increased Amtrak *Cascades* service, WSDOT will continuously work with our partners to identify projects and cost allocation until project build-out in 2018. Figures ES-2 through ES-4 indicate the general location of these projects.

### Vancouver Yard Upgrades

This project consists of a double-track bypass of the Vancouver Yard, a siding extension, and associated turnouts from



**Figure ES-2**  
**Service Level One Projects in Southwest Washington**

mile post 132.6 to mile post 136.5. The bypass will separate grain freight traffic from passenger traffic to allow for projected increased traffic in both. It will also relieve congestion for freight coming from eastern Washington.

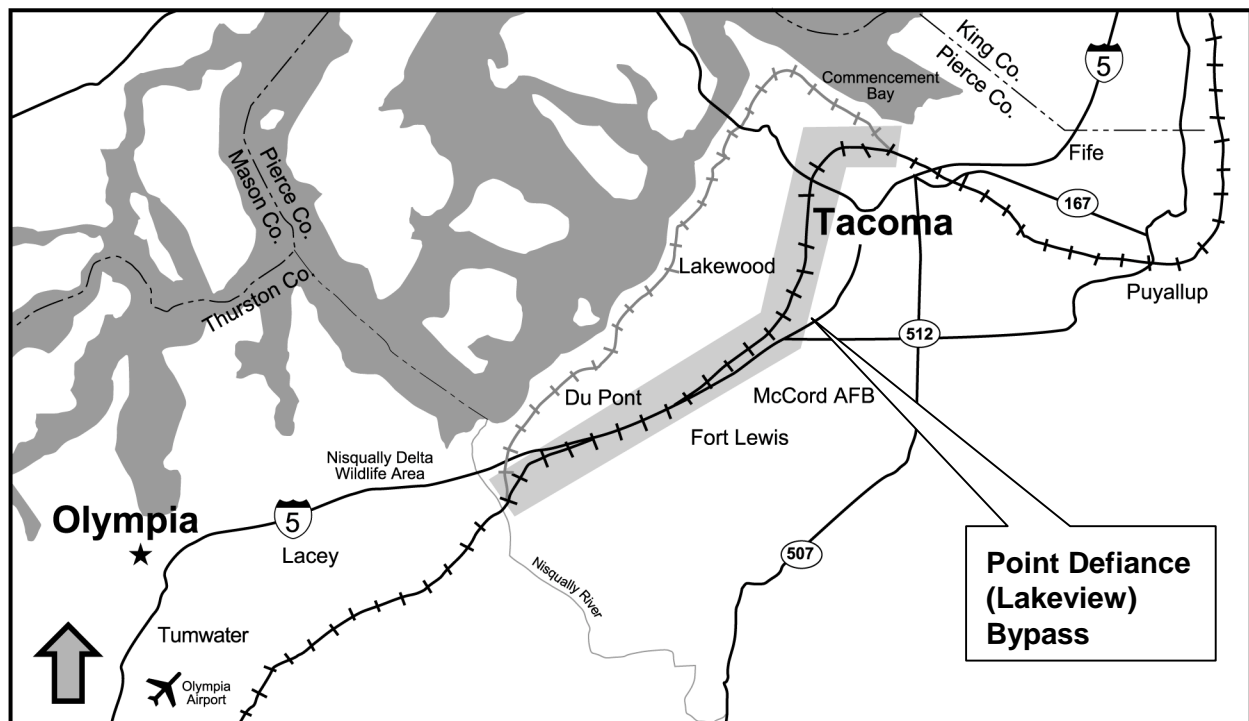
### **Kelso to Martin Bluff Third Main Line**

This project consists of adding a third main line track from mile post 96.3 to mile post 113.2. Included in this project is the extension of the Kalama freight running track by approximately 4,000 feet to the south. The third main line will separate passenger traffic from freight traffic allowing an increase in the number of passenger trains. Freight access to the Port of Kalama will be improved with the extension of the freight running track.

2,300 feet to the north connecting it with the Steam Plant spur at mile post 51.86. This project will increase capacity on the main line by removing the connection to the Steam Plant spur from the main line and moving it to the extended siding.

### **Point Defiance (Lakeview) Bypass**

Located in Pierce County, this bypass will allow faster-moving passenger trains to bypass the curvy tracks and single track tunnels along Point Defiance. Freight trains will continue to use the existing track around Point Defiance. This project will realign approximately two miles of single track for passenger service between mile post 9.8 on the Lakeview Branch and main line mile post 24.4.



**Figure ES-3**  
**Service Level One Project in South Sound Area**

### **Centralia Siding Extension**

The existing siding in Centralia extends along the east side of the track, ending at mile post 52.3. The siding will be extended

A new single passenger track will also be installed between mile post 0.0 and mile post 9.8 on the Lakeview Branch. The new tracks will have associated crossovers, locks,



turnouts and signaling. The purpose of this bypass is to separate passenger rail from freight rail. This bypass will serve passenger trains and allow them to travel at higher speeds, thus decreasing travel times along the corridor.

### **Bellingham Siding Extension**

This project consists of extending the existing siding beyond the steep grade to the north. Completion of this infrastructure improvement will result in increased capacity and train reliability.

### **What Projects Will Be Undertaken by Our Partners?**

As part of our ongoing partnerships, a number of projects that will benefit Amtrak *Cascades* service will be implemented by Sound Transit, Amtrak and BNSF over the next few years. These projects are as follows:

- Glacier Park to Kent, Additional Trackage and Rail Rehabilitation
- Interbay Double Tracking
- Ballard Double Tracking
- Edmonds Double Tracking
- Mukilteo Double Tracking
- English Siding Extension in Snohomish County
- Stanwood Siding Extension
- Mt. Vernon Siding Extension
- Custer Siding Extension
- Bellingham Main Line Relocation

WSDOT has participated in reviewing the environmental documentation and engineering design of these projects.

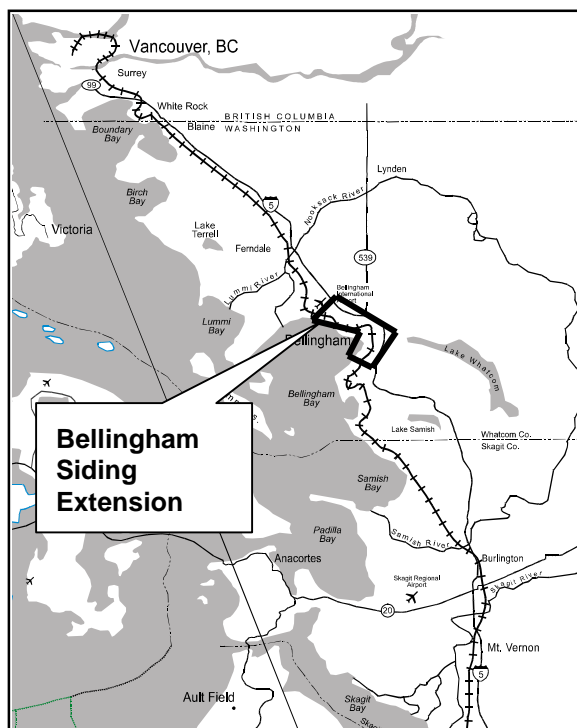
### **Potential Improvements**

WSDOT and our partners have identified areas along the corridor that may need track and facility improvements. Figure ES-5, on the following page, identifies these areas and potential solutions. Due to changing freight demand, it is virtually impossible to project exactly where and what types of improvements will be needed on the future. As the program moves forward, solutions will be developed and implemented over the next 20 years.

### **Environmental Overview**

The feasibility of a plan and its implementation often depend on whether it will have impacts on the communities that it is intended to serve or if construction of its components will impact the surrounding natural environment.

WSDOT has been working with the Federal Highway Administration and the Federal Railroad Administration to identify the appropriate level of environmental analysis



**Figure ES-4  
Five Year Projects in Northwest Washington**



for Washington's intercity passenger rail program. It has been agreed that the environmental process for the intercity passenger rail program will include:

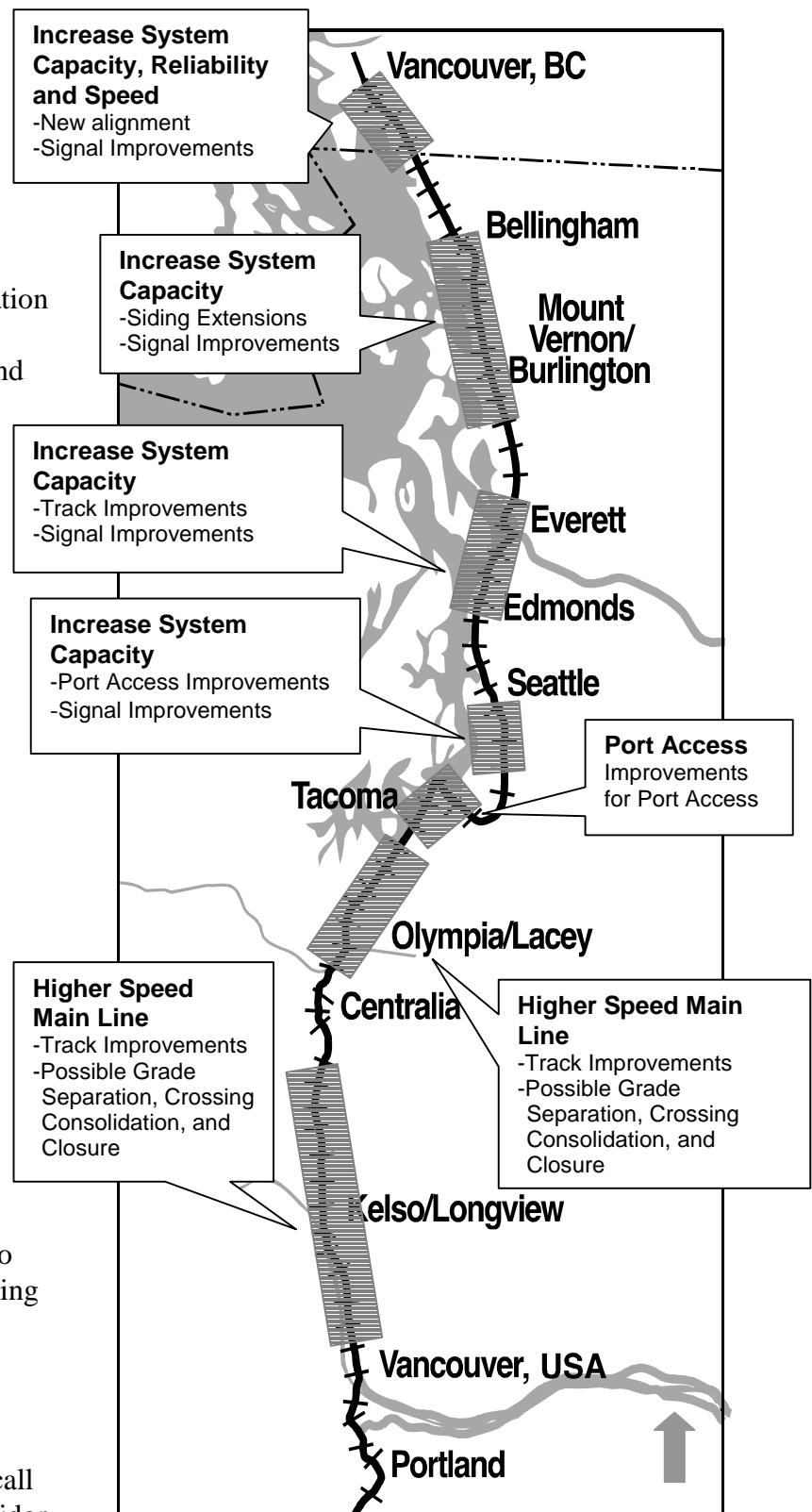
- An environmental overview that presents general impacts and mitigation as they relate to potential project improvements and service levels; and
- Detailed NEPA/SEPA documentation for service level projects as they are identified. WSDOT is currently performing detailed NEPA/SEPA environmental review for the project improvements needed to implement service level one. This document is expected to be available to the public in the summer of 2000.

## Financial And Institutional Framework

Extensive analysis of current and future railroad operations reveals that there are many infrastructure improvements needed to meet WSDOT's vision of increased passenger rail service while maintaining freight capacity needs. To meet service and capacity demands, WSDOT is working with our partners to identify projects, their costs, and financing options.

## What Will The Total System Cost?

The most recent capital cost estimates call for a \$1.9 billion investment in the corridor. However, this cost estimate is for the corridor as a whole – a corridor that includes intercity passenger rail along with freight



**Figure ES-5  
Potential Troublespots and Future Possible Solutions**

rail and commuter rail. In addition to the capital costs, passenger rail will require an additional \$200 million for operations, for a total of \$2.1 billion.

## Capital Investments

To achieve WSDOT's vision of faster and more frequent service, it is imperative that improvements and investments be made throughout the corridor, from Oregon to British Columbia. In addition to the three jurisdictions, our other partners - BNSF, Sound Transit, and Amtrak - will also need to make capital investments in the corridor. To fulfill the rail system needs of all users over the next 20 years, annual public and private investments in the corridor will start at approximately \$85 million and grow to more than \$167 million by 2018. However, it should be recognized that total costs can only be broadly estimated, given the uncertainties involved in projecting future expenses.

Table ES-4 provides an overview of capital investments required in the corridor over the next 20 years. These investments include planned track and facility improvements in addition to other corridor track investments, such as new trains and station improvements. As indicated, only a portion of the total corridor investment will benefit primarily passenger rail.

A significant share of the \$1.9 billion invested in the corridor will be directed towards general corridor improvements, such as bridge upgrades and crossing improvements that will serve passenger rail,

commuter rail, and freight traffic. A planning-level review of the projects proposed for the corridor indicates that approximately 75% of the total facilities costs can be attributed to intercity passenger rail for the entire corridor, including

**Table ES-4  
Corridor Capital Costs  
(in millions of 1997 dollars)**

	2003	2018	Total
<b>Corridor Facilities Investments</b>			
Oregon	\$36	\$156	\$192
Washington	\$164	\$448	\$612
British Columbia	\$45	\$610	\$655
<i>Total Corridor Capital Investments</i>	<i>\$245</i>	<i>\$1,214</i>	<i>\$1,459</i>
<b>Miscellaneous Capital Costs</b>			
Trainsets	\$90	\$135	\$225
Land Acquisition	\$13	\$25	\$38
Station Improvements	\$12	\$131	\$143
<i>Total Miscellaneous Capital Costs</i>	<i>\$115</i>	<i>\$291</i>	<i>\$406</i>
<b>Total Corridor Rail Costs</b>	<b>\$360</b>	<b>\$1505</b>	<b>\$1865</b>

Washington, Oregon and British Columbia. This means that approximately \$1.5 billion of the total \$1.9 billion in corridor investments is associated with improving intercity passenger rail service in the corridor.

## Operating Costs

According to the Pacific Northwest Rail Corridor Operating Plan, the total annual cost of providing intercity rail service (operations and maintenance) is projected to

range from today's approximately \$29 million to more than \$72 million at project buildout, excluding the effects of inflation. Operating revenues, which include income from passenger fares and on-board food and beverage sales, are currently meeting approximately 55% of regional costs.<sup>2</sup>

Estimates have been developed that highlight how the anticipated growth in ridership will build operating revenues, improve the system's farebox recovery, and reduce the required operational subsidy. Looking forward, with full implementation of the Plan, operating revenues are expected to increase to approximately 65% of operating costs by the year 2003 and to increase to more than 100% by program completion. This results in operating subsidy requirements of approximately \$18.0 million per year to start; they will gradually decrease until all operations costs are expected to be recovered from operating revenues. These estimates are expressed in constant 1997 dollars and are based on current operating experience and comparable corridor activity elsewhere in the Amtrak system.<sup>3</sup>

### **Who's Going To Pay For It?**

To answer the question of how we will pay for the expansion of passenger rail service, we must first identify who is being asked to make the investment. For the purposes of this evaluation, the state of Washington is

assumed to be asking this question. Thus, the analysis focuses on the elements of the program that could be WSDOT's responsibility. The balance of the funding is expected to come from the other principal partners (in particular British Columbia and the state of Oregon), and from our in-state partners (such as Sound Transit and the freight railroads). It is important to note that no long-term financial commitments have yet been made by any of these entities.

### **How Will Costs Be Allocated?**

At this time, the issue of cost allocation cannot be resolved. Therefore, for the purposes of analyzing the financial implications for the state of Washington, a division of cost responsibility among the principal partners was made. It is assumed that WSDOT will be responsible for facility improvements located in the state of Washington, plus half of the rolling stock requirements and half of the annual operating subsidies. The rolling stock and operating subsidy requirements assume that these costs will be shared equally between Washington and British Columbia for the Seattle - Vancouver, BC service and between Oregon and Washington for the Seattle-Portland/Eugene service.

Allocation of in-state costs is also necessary. The in-state program costs include all necessary improvements to ensure the efficient movement of intercity passenger rail and freight rail in the corridor plus new commuter rail service in the central Puget Sound area. Many projects will be to the benefit of all of these entities. The actual cost allocation will be determined on a project-by-project basis and will be the result of negotiations among WSDOT, Sound Transit and the railroads.

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<sup>2</sup> It should be noted that this analysis excludes the impact of Amtrak's *Coast Starlight* service. Although this train does serve passengers traveling within the corridor, it is primarily designed to serve the major cities of the west coast and therefore was not included in the analysis of corridor costs and subsidies.

<sup>3</sup> Berk and Associates, Economic Analysis for the Intercity Passenger Rail Program for Washington State, September 1998.

For planning purposes, a rough allocation has been prepared. Table ES-5, below, presents the criteria that were applied to the corridor projects within Washington. The Sound Transit District [also called the Regional Transit Authority (RTA) District] is a taxing district approved by Puget Sound

area voters in 1996. The counties involved are Snohomish, King, and Pierce.

Table ES-6, also below, shows a preliminary cost allocation for WSDOT based on the identified criteria. It is important to note that this allocation is for illustrative

**Table ES-5**  
**Cost Allocation Criteria for Capital Costs in Washington State**

<b>Project Location</b>	<b>Primary Project Goal</b>	<b>WSDOT's Share</b>	<b>Partners' Share</b>
Outside of the Sound Transit District	To meet passenger rail requirements	100%	
Outside of the Sound Transit District	To meet general capacity requirements	50%	50%
Within the Sound Transit District	To meet passenger rail requirements	50%	50%
Within the Sound Transit District	To benefit all rail users	33%	66%

Source: Berk & Associates, *Economic Analysis for the Intercity Passenger Rail Program for Washington State*, September 1998.

**Table ES-6**  
**Preliminary Washington State Department of Transportation Cost Allocation**  
**(Millions of 1997 US Dollars)**

	<b>Corridor Total</b>	<b>WSDOT's % Share</b>	<b>WSDOT 98-03</b>	<b>WSDOT 04-18</b>	<b>WSDOT Total</b>
Facilities	\$1,459	32%	\$125.0	\$340.0	\$465.0
Land and Stations	\$181	100%	\$25.0	\$156.0	\$181.0
Trainsets	\$225	50%	\$45.0	\$67.5	\$112.5
Total	\$1,865	41%	\$195.0	\$563.5	\$758.5
Operating subsidies (1998-2018)	\$225.5	50%	NA	NA	\$112.75
Total requirements	\$2,095	42%	NA	NA	\$871.25

Source: Berk & Associates, *Economic Analysis for the Intercity Passenger Rail Program for Washington State*, September 1998.

purposes only. At this time, there has not been any formal agreement among the various interested parties regarding the issue of cost sharing for proposed improvements. These figures are only for use in developing a preliminary financial analysis for the Washington elements of the proposed program. The total funding commitment required during the development of the program is \$2.1 billion, expressed in 1997 dollars. Of this amount approximately 42% or \$871.25 million can reasonably be allocated to WSDOT.

### **Is It Worth The Investment?**

In the fall of 1998, an independent study was performed to objectively analyze whether passenger rail is a competitive and viable transportation alternative. This economic analysis employed a methodology called “cross-modal analysis.”

This analysis was designed to aid policy-makers seeking to establish funding priorities for scarce transportation resources. The analysis looked at the total public and private costs of passenger rail, highway, and air travel; it compared those costs to the amount of use for each system. It did not attempt to evaluate the marginal cost of a particular trip and so is not intended as a commentary on potential mode choice decisions. This analysis was not intended to address all of the issues regarding transportation costs and investments. It merely aimed to establish a framework to compare different intercity transportation systems and to inform the ongoing funding priority deliberations.

### **Findings Of The Cross-Modal Analysis**

The cross-modal analysis was performed in two steps. First, the direct and indirect operating costs (direct operating costs, travel

time and externalities) were compared among the three intercity modes. Following this analysis, a comparison of the full costs, including annualized capital costs per passenger mile, was performed.

The approach of separating capital and operating costs allowed for a direct comparison among the modes without the potentially distorting effects of the current capital costs. Since passenger rail service is currently a relatively minor element in the intercity travel market, there is substantial investment required to bring it into a competitive position in terms of service frequency and travel time. The other two modes are well established and require a smaller infusion of capital.

When these methods were applied to intercity passenger rail in the Pacific Northwest Rail Corridor, results reveal that passenger rail service is comparable to both air and highway travel. This approach indicates that by 2020 rail costs will range from \$0.97 to \$1.27 per passenger mile, while highway travel is estimated to cost from \$1.42 to \$1.79 per passenger mile.

Highway capital costs over the current period of study do not exceed \$0.012 per passenger mile, but they reach more than \$0.60 per passenger mile for rail. This variation is largely driven by three key factors:

- Rail is in a different place in the investment cycle. While highway and air are mature systems, rail is still in the process of building a system infrastructure.
- Projected levels of ridership differ for each mode. Total highway capital costs (\$2.3 billion) exceed those for rail (\$1.5

billion). However, given the 15.5 billion vehicle miles that are projected for the I-5 corridor in 2015, average costs are significantly lower for highway travel.

- The levels of investment in rail and highway are designed to meet different level-of-service goals.

The final step of the cross modal analysis was to combine the total operating costs per mode with the capital costs.

## Conclusions

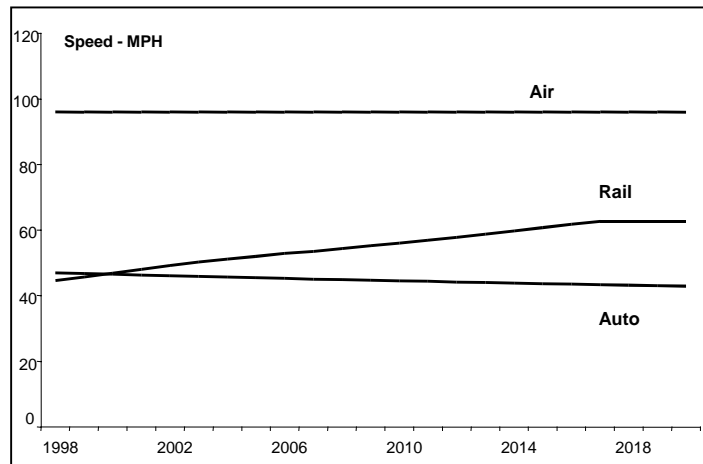
The results of this analysis show that the investment in the rail system will result in significant improvements in the level-of-service, both in terms of frequency of service and reduced travel times. The investments in the highway system will not have a significant impact on the degradation in the overall level-of-service, as average speeds are projected to continue to slow throughout the period. Figure ES-6 illustrates this point.

The cost per passenger mile for rail travel will begin to decrease in the years beyond the current planning horizon. This is because the rate of capital investment is expected to be significantly lower in the years beyond 2018. By then improvements will be complete and service objectives met; therefore, future capital needs are likely to be limited to rehabilitation and maintenance needs.

## How Will Future Expansion Of Passenger Rail Service Be Implemented?

To continue with passenger rail expansion, WSDOT will update operational, financial, and environmental documentation to provide accurate information to taxpayers and

**Figure ES-6  
Comparison of Level-of-Service Among Modes Over Time**



legislators. Steps that will be taken periodically include:

- Review of current market demand;
- Updated track capacity analysis;
- Revised operational analysis;
- Identification of track and facility improvements necessary for increased service;
- Identification of funding sources;
- Negotiations and agreement on cost allocation of project improvements;
- Public involvement;
- Consumer market research;
- Revision of this Plan; and
- Environmental studies for project improvements.